QUARTERLY PROGRESS REPORT

April 1 to July 1, 1967

New England Research Application Center
University of Connecticut
Storrs, Connecticut 06268

NASA Contract
NSR 07-002-029

New England Research Application Center
University of Connecticut

QUARTERLY PROGRESS REPORT
April 1 to July 1, 1967

SUMMARY

This document reports the progress made under NASA Contract No. NSR 07-002-029 to establish and operate a regional dissemination center under the auspices of the Technology Utilization Program.

The first three months have seen our efforts primarily devoted to becoming operational. The recruitment of staff, the acquisition of data, documents and equipment, and the movement into larger quarters all have taken place. The current estimate of achieving full operational status is July 10. Marketing efforts have been delayed until essentially immediate service would be possible. Case documentation activities have gotten under way in order to establish an initial point of reference. Work for a management workshop in technology transfer and utilization has begun as has work on proposals to the State Technical Services groups in Connecticut and Massachusetts.

New England Research Application Center
University of Connecticut

QUARTERLY PROGRESS REPORT
April 1 to July 1, 1967

The following description of progress made toward establishment of an operating regional dissemination center for New England is organized in three parts. These parts represent the principal components of a production operation, namely; input, transformation process, and output.

I. Input Progress

A. Computer Tapes:

All computer tapes have been received from NASA's Science and Technology Information Division Facility (Documentation, Inc.), checked out, and reformated for use by NERAC.

B. Abstract Cards:

Abstract cards prior to 1967 were unexpectedly found not to be available from the NASA Facility. Four partially complete sets of cards were located at the MRI-ASTRA RDC. These four sets of abstract cards were shipped to NERAC for sorting with the understanding that NERAC would keep two of the sorted sets and ship the others back to MRI. Students have been hired to perform the sorting operation. The cards have been sorted chronologically backwards through most of 1965. In the two NERAC sets, missing cards or those which are illegible or mutilated are being replaced by abstracts cut from STAR and IAA and pasted on cut-down IBM cards. The sorting function should be complete as of July 21; the cut-and-paste operation's projected completion date is September 1. The two sets being returned to MRI will have been sorted and tabs inserted where cards are missing. The unanticipated

cost to NERAC resulting from this operation is presently estimated at $11,000.

C. Microfiche Cards:

Microfiche cards have been received. They were shipped to NERAC in more or less random order. When the file cabinets for the microfiche are received, students will be used to sort the microfiche by accession number directly into the file drawers. Sorting will start near the end of July. The unanticipated cost of sorting these cards is presently estimated to be $3,000.

II. Transformation Process Progress

A. Technical and Service Operations:

1. Personnel

Three University of Connecticut faculty members have so far been lined up to serve as Technical Specialists. They are: H. Ornstein, M.S., Mechanical Engineering; W. Smith III, M.S., Electrical Engineering; and Dr. George Campbell, Ph.D., Aerospace Engineering. The first two of these are also doctoral candidates; the latter is Head of the Department of Aerospace Engineering.

Mr. Tadelusz Siek has been offered a position as Applications Specialist; it is expected that he will accept the position.

The rest of the operations staff currently consists of one (1) Activities Coordinator, two (2) Clerk/typist/operators, and an average of 10 students working on the abstract, microfiche, and document operations.

2. Systems and Procedures

Based on a detailed implementation of the ideas incorporated in the simulation prepared for the feasibility study, operating procedures have been developed as well as methods for capturing

cost and efficiency data and for monitoring and controlling the Center's operations. Procedures have been developed for receiving and following up leads, for processing the search questions, and for receiving feedback from the clients on rendered services.

3. Offices

Office space has been allocated, partitions have been erected, wiring is complete and telephone installation should be complete before the end of the first week in July.

4. Furniture and Equipment

Most of the furniture, filing cabinets and bookcases, XEROX 914 copier, abstract filing cabinets have all been received.

B. Computer Operations:

During this reporting period, NERAC computer operations have progressed from an experimental mode to a completely operational mode. This fast transition was made possible by advanced planning and installation of an in-house computer.

The advanced planning consisted of evaluating information retrieval alogarithms written for a large compiler-oriented computer, evaluating possible effects of an in-house computer on NERAC operations, and developing a retrieval program system for an in-house computer in advance of the arrival of the computer. The evaluations are described and reported in "NASA Technology Utilization Project, University of Connecticut, April 21, 1967, Final Report." The pre-arrival program development was carried on at a local IBM Test Center.

The in-house computer arrived early on the morning of May 31 and cosisted of an IBM 1401 system with an 8K storage, two 7330 tape drives, 1402 card read-punch, and 1403 line printer. The machine was installed and IBM supplied software checked out by 3:00 that afternoon. The

previously developed retrieval programs were in use by the end of the day. A summary of the progress to date in the computer area now follows.

1. Physical Setup
   a. Computer delivered, checked out, and accepted.
   b. Key punch delivered and installed.
   c. Tape and card cabinets delivered.
   d. File cabinets, desks, bookshelves, etc., installed.
2. Program Development
   a. Two reformating programs have been flowcharted, debugged, and tested. (See Exhibit 1 for sample output.)
      (1) Program to edit 1962-63 NASA linear file tapes with very large "image" fields.
      (2) Program to reformat 1964-67 NASA linear file tapes in standard format.
   b. Two search programs are now in use. (See Exhibit 2 for sample output.)
      (1) Slow search routine performing binary search strategies of and's and or's but no parentheses.
      (2) Fast search routine performing complete binary search strategies of and's, or's, not's, and parentheses in any combination.
   c. Two question search strategy conversion routines to convert natural English language binary strategies into machine form compatible with b(1) and b(2) above.
   d. A program to detect missing document numbers from our reformated tapes. The output of this program tells us what abstracts can be missing from our hard-copy file.

(See Exhibit 3 for sample output.)

e. A program which verifies the syntax or construction of each record on our reformated tapes.

f. A program which reblocks the reformated tapes for faster machine searches.

3. Staff Development and Education

a. During the past year, six advanced undergraduate students took special academic work related to the NASA Feasibility Study.

b. Three of the above students have been hired as programmer/operators.

(1) One student has written, debugged, and tested several of the above programs.

(2) The second student is modifying and converting FORTRAN to work on our small machine in hopes of using it for our statistical analysis routines.

(3) The third student is now learning about our machine by developing a letter printing routine for mass mailing.

c. All three students act as search machine operators. Their working hours overlap in such a way that the machine will be in use fourteen hours/weekday plus some eight hours on weekends.

4. Machine Searches

a. A complete reformated file has been built.

b. Several machine searches have been run as test searches to verify our search procedures.

c. Several current awareness and retrospective searches have

been run to study and evaluate our workflow and control procedures.

5. Work Scheduled for Next Reporting Period

a. Refinement of all computer routines leading to better documentation.

b. Refinement of automatic bookkeeping procedures to provide complete tape usage reports plus machine usage reports.

c. Statistical data accumulation to follow each machine search run.

d. Work and Cost Reduction experiments\ projects such as computer abstract reproduction and TECH BRIEF search.

C. System Operational Status

A goal of complete operational status was set for July 1, 1967. It now appears that this goal will be achieved by July 10. The principal delay is getting the abstract cards into a shape that will support question evaluation operations. Although complete organization of these cards is not expected until July 21, it is believed possible to work around this problem.

III. Output Progress

A. Marketing

Full scale marketing activities have been delayed until the contract award is announced and until the Center reaches essentially full operational status. The reason for the latter delay is so that when client firms are contacted a rapid, high quality response from from the Center will be forthcoming. However, letters have been sent to the firms that signed the letter of intent to contract for NERAC services should the center become operational. The expiration date on these letters was April 31, 1967, so the letters mailed in

June were to notify these companies that we would be in business in the near future.

To support the upcoming marketing campaign we have developed a brochure that describes the Center, its resources and services. A copy may be found in Exhibit 4. We have also developed service memos and a price list that describe the individual services in some detail. These are attached to this report as Exhibit 5.

B. Case Documentation:

In an attempt to learn more about the process of technology transfer and the utilization of information derived from external means, we have instituted an active program of case documentation. Simply put, our goal is to document the objectives and expectations of all the people involved in the process. This includes a detailed study of the Center's personnel as well as the people contacted in both client and non-client firms that are interviewed.

Erwin Phelps is acting as project manager for this activity. He was chosen on the basis of his experience, interest and reputation. Further, as a consultant to the Center, he brings a degree of objectivity that would be difficult to achieve through the use of Center personnel. The obviously subjective nature of case documentation, therefore, makes the utilization of Mr. Phelps in this role particularly desirable. His resume may be found in Exhibit 6.

C. Management Workshops in Technology Transfer and Utilization:

Work is underway to develop a three day seminar/workshop in the area of technology transfer. All those firms that were interviewed during the feasibility study that expressed an interest in this kind of activity have been contacted for additional information on course content.

Dr. William J. Abernathy of UCLA, in residence at the University of Connecticut for the summer, is acting as project manager for this activity. It is planned that a document will be forthcoming which will outline the course, the teaching approach and materials as well as providing a relevant bibliography. This report will be forwarded to NASA for possible issuance as a special report. A brief biographical sketch of Dr. Abernathy is included in Exhibit 7.

D. Proposals to State Technical Service Programs:

We are presently preparing proposals to provide various services under the STS act in both Massachusetts and Connecticut. The proposed services include such things as providing broad retrospective and general area profiles (standard profiles) for STS distribution to industry groups. In addition, more detailed reports in critical areas of concern to the states are contemplated. For example, the joining and coating of materials is considered to be a very important technology problem in Connecticut. The proposal in this case is to identify relevant material in the NERAC information resource and then to have this evaluated and interpreted in terms of Connecticut problems. This latter may be done in conjunction with the technical skills of the University's Materials Science Institute.

1ANEMOMETER 1BOUNDARY 3BOUNDARY LAYER SEPARA1CONFERENCE 1FLOW
1FRICTION 1HOT WIRE 3HOT-WIRE ANEMOMETER 1LAYER 1PROFILE
1SEPARATION 1SHEAR 3SHEARING STRESS 1SKIN 3SKIN FRICTION
1STRESS 1TURBULENT 3TURBULENT FLOW 1VELOCITY 3VELOCITY PROFILE

11-12 A67-24046 THE APPLICABILITY OF TURBULENCE RESEARCH TO THE SOLUTION OF INTERNAL FLOW PROBLEMS.

1BOUNDARY 3BOUNDARY LAYER FLOW 1CONFERENCE 1ENERGY 3ENERGY SPECTRUM
1FLOW 1INTERNAL 1LAYER 1MIXING 1SPECTRUM
1TURBULENT 3TURBULENT FLOW 1WAKE

11-01 A67-24047 TURBULENT JETS AND WAKES IN A PRESSURE GRADIENT.

1CONFERENCE 1FLOW 1GRADIENT 1JET 1MEAN
1MOMENTUM 3MOMENTUM TRANSFER 1PRESSURE 3PRESSURE GRADIENT 1PROFILE
1ROTATION 3ROTATIONAL FLOW 1SYMMETRY 1TIME 1TRANSFER
1TURBULENT 3TURBULENT JET 1VELOCITY 3VELOCITY PROFILE

11-12 A67-24048 CRITICAL REVIEW AND CURRENT DEVELOPMENTS IN THREE-DIMENSIONAL TURBULENT BOUNDARY LAYERS.

1BOUNDARY 1CONFERENCE 1DEFECT 1EQUATION 1GRADIENT
1HYPOTHESIS 1LAYER 1PRESSURE 3PRESSURE GRADIENT 1SHEAR
3SHEARING STRESS 1SIMILARITY 3SIMILARITY HYPOTHESIS1STRESS 1TURBULENT
3TURBULENT BOUNDARY LA

11-12 A67-24049 THE APPLICABILITY OF SECONDARY FLOW ANALYSES TO THE SOLUTION OF INTERNAL FLOW PROBLEMS.

1AIRFOIL 1AXIAL 1BLADE 1BODY 1CASCADE
3CASCADE FLOW 1COMPRESSOR 1CONFERENCE 1DYNAMICS 1FLOW
1FLUID 3FLUID MECHANICS 1INVISCID 3INVISCID FLOW 1IRROTATIONAL
1SECONDARY 1SLENDER 3SLENDER BODY 1TURBINE

11-01 A67-24050 EXPERIMENTALLY DETERMINED OPTIMUM GEOMETRIES FOR RECTILINEAR DIFFUSERS WITH RECTANGULAR, CONICAL OR ANNULAR CROSS-SECTION.

1BOUNDARY 3BOUNDARY LAYER FLOW 1CHARACTERISTICS 1CONFERENCE 1CONICAL
3CONICAL NOZZLE 1CROSS SECTION 3DIFFUSER 1EFFECT 1FLOW
3FLOW CHARACTERISTICS 1GEOMETRY 1LAYER 1NOZZLE 3NOZZLE GEOMETRY
1OPTIMUM 1PERFORMANCE 1PRESSURE 1RECTANGLE 1REGIME

11-12 A67-24051 SOME PROBLEMS OF RECOGNIZING AND DEFINING SEPARATION OF THE SKEWED BOUNDARY LAYER.

1ANGLE 1ASPECT 3ASPECT RATIO 1BOUNDARY 3BOUNDARY LAYER SEPARA
1CONFERENCE 1FLOW 3FLOW SEPARATION 1INCIDENCE 1LAYER
1RATIO 1SEPARATION 1SKEW 1TURBULENT 3TURBULENT FLOW
1WING

11-23 A67-24052 THE ROLE OF SCATTER IN DETERMINING THE RADIATIVE PROPERTIES OF SURFACES.

1ABSORPTION 1ALBEDO 1COEFFICIENT 1COLLECTOR 1CONFERENCE
1EMISSIVITY 1EXTINCTION 1INTENSITY 1LIGHT 3LIGHT SCATTERING
1PROPERTY 1RADIATION 3RADIATION ABSORPTION 1REFLECTION 1SCATTERING
1SELECTION 1SOLAR 3SOLAR COLLECTOR 1SURFACE 3SURFACE PROPERTY
1TEMPERATURE 3WAVELENGTH

11-11 A67-24053 MEASUREMENT OF THE TOTAL FLUX AND ITS SPECTRAL COMPONENTS IN SOLAR SIMULATION SYSTEMS WITH SPECIAL REFERENCE

EXHIBIT 1

QUESTION NUMBER - 000005 STRATEGY DATE 06 01 67 (MON DAY YR) RUN DATE 08 04 67 (MON DAY YR)

03-14	N67-12807	A NEW TYPE OF THERMOBALANCOGRAPH AND RESULTS OF ITS TESTS UNDER FIELD CONDITIONS
03-14	N67-13074	MOSAIC ELECTRO-OPTICAL TECHNIQUES
07-14	N67-17669	PIEZORESISTIVE STRAIN GAGE ACCELEROMETERS
07-14	N67-17702	DEVELOPMENT OF A HIGH-INTENSITY SOLID-STATE GAMMA-RAY DOSIMETER SYSTEM
10-03	N67-20394	ANALYSIS OF SPECTRAL AND TEMPERATURE CHARACTERISTICS OF PHOTOELECTRIC TRANSDUCERS AND SELECTION OF EFFICIENT RANGES FOR THEIR APPLICATION
10-14	N67-20711	MINIATURE SEMICONDUCTOR PRESSURE SENSOR

EXHIBIT 2

THIS LIST CONTAINS ALL MISSING DOCUMENTS - TOTALS FOLLOW AT END FOR EACH TYPE DOCUMENT

67A-25523 67A-25524 67A-25794 67A-26059 67A-26237 67A-26238

NUMBER OF A DOCUMENTS IS 000006

NUMBER OF A-80000 DOCUMENTS IS 000000

NUMBER OF N DOCUMENTS IS 000000

NUMBER OF N6 DOCUMENTS IS 000000

NUMBER OF N7 DOCUMENTS IS 000000

NUMBER OF N8 DOCUMENTS IS 000000

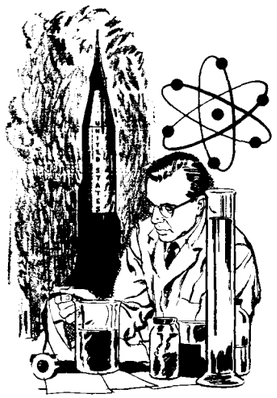
NUMBER OF N9 DOCUMENTS IS 000000

EXHIBIT

3

Exhibit 4

RESEARCH
... key to growth



Significant in today's dynamically changing business world is the increasing gap between technological developments currently available and the actual amount being assimilated by industry to generate growth and profits. Technology is exploding. Can your firm easily find what it needs? Can it efficiently adapt this technology to its environment?

NERAC – The New England Research Application Center was founded at the School of Business Administration, University of Connecticut and sponsored by NASA. NERAC's purpose is to aid New England industry in discovering, understanding and utilizing the results of worldwide research and development activities.

NERAC's resources include: the vast and growing information files of NASA and other agencies; the experience and know-how of its technically-trained, business-oriented Applications Specialists; the imposing scientific and engineering knowledge of its Technical Specialists and a fast, efficient, computerized information retrieval system.

RETRIEVAL
... key to savings

RS Retrospective Search Program: Computerized literature searches which probe the entire information file. Information is extracted which relates to the specific problem defined by a dialogue between NERAC's Technical Specialist and a client firm's technologist. Service as rapid as two days is available.

CA Current Awareness Program: A computer search of each month's additions to the information file to keep the company technologist up to date on the specific problem which he defined together with NERAC's Technical Specialist.

GAP General Area Profile: A general monthly search of additions to the file designed to keep technologists aware of the latest developments in areas of broad interest, such as welding, lubrication and heat transfer.

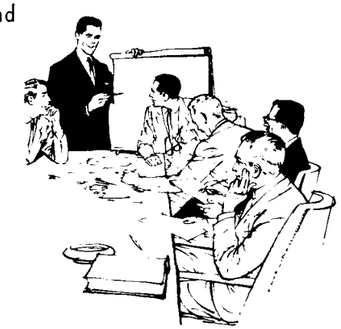
GIST General Interest Selections of Technology: A program designed to assist firms lacking scientists and engineers. Information relevant to a client's needs will be brought to the firm's attention by NERAC's Applications Specialist, who will explain the information and how the firm may profit by this knowledge.

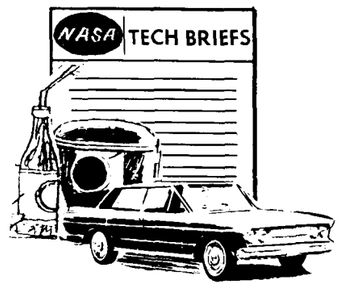
The results of each computer search are evaluated by a NERAC Technical Specialist to ensure that the data is truly relevant to the firm's problem.

APPLICATION
... key to profit

New Product Opportunity Program:
The NERAC Applications Specialist, through his continuing contact with the client firm, develops a profile of the firm's product and process goals and needs.

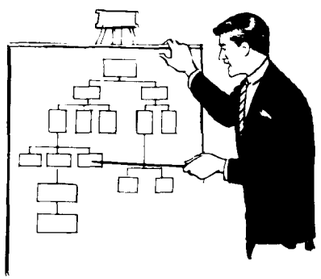
- Meetings between Applications and Technical Specialists can find solutions to product and process needs from supposedly unrelated technical fields.
- User/Producer Conferences: Firms having needs in a common area of technology are brought together with groups having experience and expertise in that area.





NASA Tech Briefs and Special Publications: These describe product and process innovations, methods and techniques and state of the art surveys. NERAC's Applications Specialist identifies those technically-oriented management groups interested in ideas and concepts for improving their firm's products and processes and directs pertinent Briefs and Publications to them.

Industrial Systems Management and Technology Program: NERAC's Applications Specialist points out research related to the firm's management needs. Workshops are organized to acquaint management with the usefulness and applicability of government sponsored management research.



Referral: When consulting help or other services are needed, NERAC's Applications Specialist can refer the firm to an appropriate source.

TECHNOLOGY APPLIED FOR PROFIT

TAP the NERAC resources...

... for TIMELY service

- Relevant information
- As it is generated
- As it is needed

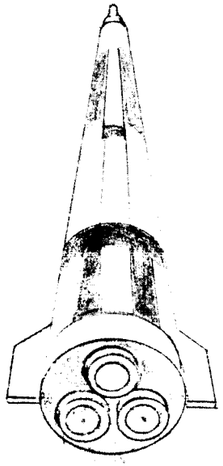
... for PERSONAL service

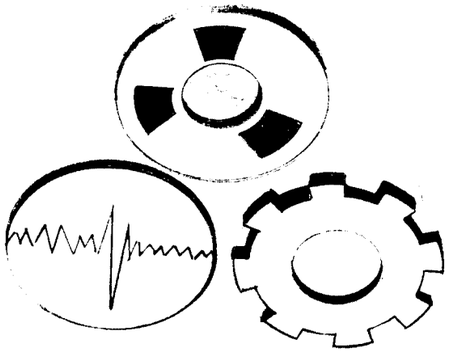
- NERAC's Applications Specialist and members of your management define and clarify your firm's overall technological needs. The Applications Specialist tailors a ...
- NERAC service package to meet these needs. He follows up to insure that the service package is fulfilling its intended functions.
- NERAC's Technical Specialist, an expert in his technological field, meets face to face with your technologist to define specific technical questions and problem areas.
- NERAC's personal service ensures your firm a maximum input of relevant product and process innovations, technical information and management techniques.

... for LOW COST service

- Each NERAC service package is uniquely designed to yield maximum benefits at a minimum price to your firm.

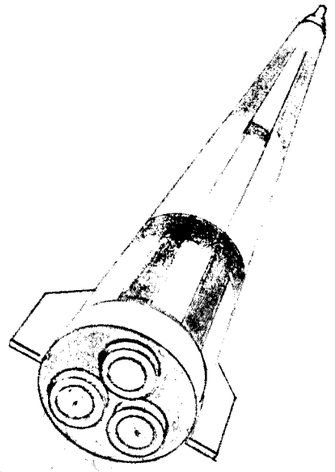
SOME COMPANIES SUCCESSFULLY USING THESE SERVICES IN OTHER AREAS...

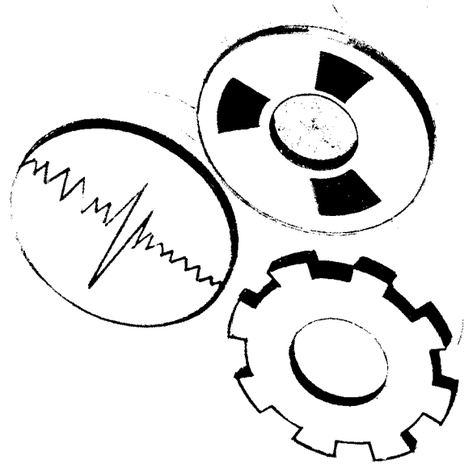




Aluminum Company of America
The Carborundum Company
Cities Service Company, Inc.
Cummins Engine Company, Inc.
Eli Lilly & Company
Esterline Angus Instrument Company, Inc.
General Electric Company
Motor & Generator Division
Lamp Division
General Motors Corporation
Allison Division
Delco Radio Division
Delco Remy
The Harshaw Chemical Company
Indiana Bell Telephone Company, Inc.
International Harvester Company
Kimberly-Clark Corporation
Koppers Company, Inc.
Pullman Incorporated
Radio Corporation of America
Texas Gas Transmission Corp.
United States Steel Corp.
Westinghouse Electric Corporation
Xerox Corporation

FOR INFORMATION WRITE:
ASSOCIATE DIRECTOR – OPERATIONS
NEW ENGLAND RESEARCH APPLICATION CENTER
BOX U-41N, UNIVERSITY OF CONNECTICUT, STORRS, CONN.
PHONE: A.C. 203-429-3311 EXT. 1125
OR
A.C. 203-429-6616





NERAC NEW ENGLAND RESEARCH APPLICATION CENTER
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EXHIBIT 5

NEW ENGLAND RESEARCH APPLICATION CENTER
University of Connecticut
Storrs, Connecticut 06268

SERVICE MEMO

IR-1

THE INFORMATION RESOURCE

The National Aeronautics and Space Administration (NASA) sponsors a vast amount of research and development activity, covering the entire spectrum of physical and natural sciences from metal forming to medicine; from textiles to telemetry. In addition, the American Institute of Aeronautics and Astronautics (AIAA), under contract to NASA, indexes articles from over nine hundred professional journals that relate in some way to aerospace research. About 42% of these journals are foreign publications. This fund of information, directly available through NERAC, consists of almost a quarter of a million documents and is currently growing at the rate of several thousand documents per month.

In addition to this basic information resource, other sources will be used as available.

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SERVICE MEMO

CA-1

CURRENT AWARENESS PROGRAM

Purpose

To aid the industrial scientist or engineer who requires a continuing awareness of scientific and technical developments that may have a bearing on specific problems within his field of responsibility.

What It Consists Of

Face-to-face meetings between technological peers to discuss and define the question or problem area, followed by monthly receipt of abstracts of documents pertinent to the problem. Upon request, hard copies of specific documents will be supplied.

How It Works

With the decision of the firm to utilize the service, representatives of the company's technical personnel meet with NERAC's Technical Specialists who will be, in general, faculty members of the University of Connecticut or other participating universities. These discussions pinpoint the problem areas or questions about which the company wishes to receive current research information. All discussions and questions to be searched remain completely confidential between NERAC and the associated firm.

Following the meeting a computer search strategy is developed by the NERAC Technical Specialist and is employed to retrieve the apparently relevant documents from the current file. The search results are evaluated by the NERAC Technical Specialist, and abstracts of relevant documents are then forwarded to the appropriate company technologist. The latter reviews the package and, on finding a document that he would like to review completely, requests a copy from the Center. Discussions between these two individuals will identify the nonrelevant material that was sent and help to further refine the question. The process is iterative until such a time as both participants are satisfied that the files are yielding a maximum of relevant material.

After this initial development of the search strategy, a monthly search will be made of the incoming documents. Again, the NERAC Technical Specialist will evaluate the results for relevancy and will transfer the appropriate abstracts to the company for their evaluation and use.

It is expected that semiannual face-to-face reviews will be conducted so that refinements and shifts in interest can be identified and so that the NERAC Technical Specialist can maintain his close understanding of the company's problems.

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SERVICE MEMO

RS-1

RETROSPECTIVE SEARCH INITIATING CURRENT AWARENESS PROGRAM

Purpose

The RS/CA search is intended to bring the industrial scientist or engineer up to date on developments having a bearing on specific problems in his field of responsibility; the Current Awareness Program will subsequently keep him up to date in these areas.

What It Consists Of

Face-to-face meetings between technological peers to discuss and define the question or problem area, followed by receipt of a folder of abstracts of documents pertinent to the problem. Upon request, hard copies of specific documents will be supplied.

How It Works

See Service Memo CA-1. Under RS/CA, the entire file is searched; under CA, only the current month. The initial meetings and refinements described in CA-1 will be performed as part of the RS/CA, and will not be performed again under the CA service.

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SERVICE MEMO

RS-2

RETROSPECTIVE SEARCH SERVICE

Purpose

The RS service is intended to bring the industrial scientist or engineer up to date on developments pertaining to specific problems in his field of responsibility.

What It Consists Of

A folder of abstracts of documents pertinent to the requested search. Hard copies of specific full documents will be supplied on subsequent request. The search covers the entire NASA/AIAA file.

How It Works

The NERAC Information Specialist and the company technologist define the question or problem by telephone, in consultation, where necessary, with a NERAC Technical Specialist. The Information Specialist then formulates the search strategy, runs the search, evaluates the results and has then forwarded in the form of abstracts to the company technologist. If necessary, the IS and the company technologist will subsequently confer about the results. Hard copies or microfiche of specific complete documents will be supplied upon request.

Options:

Retrospective Search (RS)----Two week search service

Demand Retrospective Search (DRS)----Two day search service

or

One week search service

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SERVICE MEMO

GAP-1

GENERAL AREA PROFILE PROGRAM

Purpose

To provide a quick, convenient way for the scientist or engineer to maintain alertness to technological developments in his broad area of interest. To provide added insurance that a pertinent piece of research will not go unnoticed.

What It Consists Of

A monthly package of abstracts of documents dealing with areas of generalized technological interest, such as Metal Properties and Testing; Lubrication and Lubricants; Polymers, Elastomers and Plastics; Magnetics.

How It Works

Upon receipt of six or more requests for a GAP search in a particular area, a search strategy will be developed by a NERAC Technical Specialist, the search run and evaluated for relevance on a monthly basis, and the results sent in abstract form to the subscribing firms. Upon request, hard copies of specific documents will be supplied.

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SERVICE MEMO

GIST-1

GENERAL INTEREST SELECTIONS OF TECHNOLOGY

Purpose

To provide a convenient way for the firm without technological expertise to be aware of the most recent technical developments and their practical implications in its general area of concern.

What It Consists Of

A monthly newsletter describing technological innovations and their implications on a practical level. Technical jargon is avoided. A NERAC Applications Specialist will meet periodically with the client firm to discuss his technological needs and problems, to bring to his attention items and information particularly relevant to his situation, and to act as a referral agent when the need arises.

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SERVICE MEMO

FS-1

FEE SCHEDULE

1. RS:	Retrospective Search	
	a. One-time	$100.00
	b. As introduction to CA service	$ 50.00*
2. DRS:	Demand Retrospective Search	
	a. One week search service	$125.00
	b. Two-day search service	$155.00
3. CA:	Current Awareness Service	
	a. With initial RS	$250.00*
	b. Without initial RS	$265.00*
4. GAP:	General Area Profile	
	a. With concurrent CA service	$120.00*
	b. Without concurrent CA service	$180.00*
5. GIST:	General Interest Selections of Technology	$180.00*
6. Special Services:	Provided on request. Fee set by negotiation.	

* Includes Applications Services

Exhibit 6

ERNEST D. PHELPS

Beech Street, RR #2
Woodstock, Connecticut, 06281
Telephone: (203) 928-3377

Married, three children
Health: Excellent
Height: 6'2" Weight: 160 lbs.

Experience

September, 1964- NICHOLS COLLEGE of BUSINESS ADMINISTRATION - Associate Professor, 1964-, Marketing Department; Chairman, 1965-; Chairman, Faculty Senate, 1967-. Faculty Advisor, Nichols Chapter, American Marketing Association.

concurrently CONSULTANT - 1966 -, Rogers Corporation; 1965 summer, Raytheon's Electronic Services Operation - wrote proposal for Women's Job Training Center; 1965-66, member, Tri-Town Community Action Council - helped write successful "Headstart" proposal (April, 1965), and unsuccessful (community belatedly adjudged "too small") OEO Development Grant proposal; 1966-, member, Northeastern Connecticut Regional Community College Advisory Committee.

March - Sept., 1964 CONSULTANT - Suprenant Division, IT&T; Spear & Staff; Boston Financial Reports, Inc.; Raytheon Company's Equipment Division.

July, 1963- MASSACHUSETTS INSTITUTE OF TECHNOLOGY - Administrative Assistant to the Dean of Engineering. Duties included preparation of reports for publication, preparation of statistical studies, handling correspondence, interviewing loan applicants, administering of funds from Foundation grants, developing administrative procedures and planning for Center for Advanced Engineering Study.

1958-1963 RAYTHEON COMPANY, EQUIPMENT DIVISION - Manager, Executive and Employee Development. Responsible for development of policies and procedures, of programs, and of local training personnel at 6 locations for 5500 managerial, professional, technician, secretarial, and production personnel. Programs included supervisory training, management development, skills training for semi-skilled, technician and professional personnel; establishment of clerical-secretarial training, and standards of performance which led to effective promotion-from-within; training to introduce changes in management policy and procedure, and Project Cost Control System; graduate work-study program with MIT and Harvard educational assistance for over 300 employees; worked with plant and laboratory personnel in institution of TV-linked graduate study module assembler and inspector program with agencies of State; preparation of programmed instruction and training of programmed instruction writer-editors; prepared personnel and training sections of proposals to agencies of US and other governments; evaluated training effectiveness and related training activities

to shifting manpower requirements of Division. Concurrently, organized and taught 1960, 1961 and 1962 course in Practice of Management for Northeastern University's Engineering Management MS Program.

1956-1958 REACTION MOTORS COMPANY (became Division of THIOKOL CHEMICAL CORPORATION) - Manager, Personnel Research and Development. Established statistical procedures for manpower planning and control; developed and conducted programs for supervisory training and manager development; organized related training for test technicians, and conversion training to handle electronic test and data read-out equipment; worked with area colleges and universities to provide after hours study opportunities.

1952-1956 OLIN MATHIESON CHEMICAL CORPORATION, New Haven Operations - Training Supervisor. Responsible for all training at multi-Divisional installation; directed 8-month rotation program for college graduates; organized program with New Haven College to develop technician and supervisory personnel for production-related engineering assignments; organized after-hours program for 225 set-up men which reduced turnover from 2.5% to .6% per week, and led to increase in production from 77% to 107% of direct labor over standard; organized program of management development for central research personnel; introduced departmentally tailored performance reviews; worked with New Haven area colleges to secure establishment of additional certificate and degree study opportunities. Concurrently, worked with Director of New Haven College as Technical Advisor to establish Executive Development Program; taught in this Program and in the Evening College.

1947-1952 WORCESTER POLYTECHNIC INSTITUTE - Associate Professor, Department of Economics, Government and Business; Coordinator, School of Industrial Management - a program for selected employees of Worcester area industry.

1946-1947 EVANSVILLE COLLEGE - Director, Evening Education, and Assistant Professor of Economics. Planned, administered, and coordinated with local industry Evening College program for 900 students.

Education BA (Economics) Acadia University, 1934; MS (Economics) Kansas State College, 1946; work toward Ph.D., Clark University, 1948-51 part-time.

Military Service ARMY AIR FORCE, 1943-45, S/Sgt and instructor of Celestial Navagation and LORAN; worked with Base Photo to develop LORAN training aids.

Publications and Societies

Harvard Business Review, January-February, 1962, "Help Your Engineers to Get Ahead". July-August, 1963 (with W. Gallagher) "Integrated Approach To Technical Staffing". Member of American Economic Association, Phi Delta Kappa, Pi Gamma Nu.

References

Will be furnished upon request.

Exhibit 7

Biographical Sketch--William J. Abernathy

Assistant Professor, Grandate School of Business Administration, UCLA, received an S. B. in Electrical Engineering from the University of Tennessee and pursued graduate studies at Harvard University leading to a Master's and Doctoral degree in Business Administration. He has several years of military experience with communications and electronics systems as well as experience with industrial development while a project engineer with DuPont. With General Dynamics/Electronics, he has held several positions, both managerial and technical, related to developing and marketing complex electronic systems. Dr. Abernathy has been a member of the research staff of the Harvard Business School, and has conducted academic studies and acted as a consultant in aerospace and other industrial areas. His memberships include the Institute of Management Sciences. He is the author of several papers on R & D management that deal with the decision making process involved in the use of parallel or sequential approaches for meeting development project objectives.